Journal of
African
Earth Sciences

(and the Middle East)

Volume 15 Contents and Author Index

Editor-in-Chief
C. A. Kogbe
Rock View International, Paris, France

Editorial Board
J. J. W. Rogers
University of North Carolina at Chapel Hill, USA
H. Faure
Laboratoire de Géologie du Quaternaire du CNRS, Marseille, France
J. R. Vail
University of Portsmouth, UK

PERGAMON PRESS
OXFORD · NEW YORK · SEOUL · TOKYO

Journal of African Earth Sciences
(and the Middle East)

Editor-in-Chief

PROFESSOR C. A. KOGBE

Rock View International, Tour Onyx, 10 rue Vandrezanne, F-75644 Paris, Cedex 13, France

Tel. (+) 331 45 80 51 61/45 80 58 31; Fax. (+) 331 45 80 92 09

Editorial Board

PROFESSOR J. J. W. ROGERS

Department of Geology, University of North Carolina at Chapel Hill, Chapel Hill, NC 27589-331, U.S.A.

Tel. (+) 1 919 966 4519; Fax. (+) 1 919 966 4519

PROFESSOR H. FAURE

Laboratoire de Géologie du Quaternaire du CNRS, Faculté des Sciences de Luminy, Case 907, F-13288 Marseille, Cedex 9, France

Tel. (+) 3391 41 38 79; Fax. (+) 3391 26 66 38

PROFESSOR J. R. VAIL

Department of Geology, The University of Portsmouth, Burnaby Road, Portsmouth PO1 3QL, U.K.

Tel. (+) 44 705 842258; Fax. (+) 44 705 842521

Editorial Advisory Board

D. E. Ajakaiye
Jos, Nigeria

A. S. Al-Sharhan
Al-Ain, United Arab Emirates

A. I. Bayoumi
Cairo, Egypt

M. J. Benkhelil
Perpignan, France

B. Bonin
Orsay, France

P. Bowden
St. Andrews, U.K.

J. Chorowicz
Paris, France

H. Driessle
Nairobi, Kenya

P. G. Eriksson
Pretoria, South Africa

J. Fabre
Grenoble, France

D. Fairhead
Leeds, U.K.

R. P. Foster
Southampton, U.K.

S. Guerrak
Algiers, Algeria

R. Guiraud
Avignon, France

R. L. Johnson
Nottingham, U.K.

J. Klerkx
Tervuren, Belgium

E. Klitzsch
Berlin, F.R.G.

J. Lang
Dijon, France

S. B. Ojo
Zaria, Nigeria

R. Said
Annandale, U.S.A.

F. P. Sassi
Padova, Italy

R. J. Thomas
Pietermaritzburg, South Africa

T. Weissbrod
Jerusalem, Israel

Aims and Scope

The *Journal of African Earth Sciences* (*and the Middle East*) is an international interdisciplinary journal devoted to all aspects of research related to the African continent and neighbouring regions. Papers incorporating the results of research on regional geology of the African cratons and mobile belts, economic geology, geophysics, structure, Quaternary geology and analysis of sedimentary basins are featured.

Submission of papers for publication is welcomed. Contributors should send three copies of completed manuscripts to the Editor-in-Chief or any of the Editorial Board.

In addition the journal will include book reviews, short notes and selected papers from the proceedings of conferences, symposia and workshops on any aspect of African geology and related subjects.

Publishing and Advertising Offices. Pergamon Press Ltd, Headington Hill Hall, Oxford OX3 0BW, U.K. Tel., (0865) 794141. Pergamon Press Inc., 660 White Plains Road, Tarrytown, NY 10591-5153, U.S.A. All subscription enquiries should be addressed to: The Subscriptions Fulfilment Manager, Subscriptions Dept., Pergamon Press Ltd, Headington Hill Hall, Oxford OX3 0BW, U.K. Annual Institutional Subscription Rate (1993): £372.00 (US$595.00). Sterling prices are definitive. US dollar prices are quoted for convenience only, and are subject to exchange rate fluctuation. Prices include postage and insurance and are subject to change without notice.

Published 8 issues/annum (2 volumes) in January, February, April, May, July, August, October and November.

Copyright © 1993 Pergamon Press Ltd

Application to mail at second class postage rate is pending at RAHWAY NJ. Postmaster send address corrections to *Journal of African Earth Sciences*, c/o Pergamon Press Inc., 660 White Plains Road, Tarrytown, NY 10591-5153, U.S.A.

Photocopy Information for Users in the U.S.A.

The Item-Fee Code for this publication indicates that authorization to photocopy items for internal or personal use is granted by the copyright holder for libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service provided the stated fee for copying, beyond that permitted by Section 107 or 108 of the United States Copyright Law, is paid. The appropriate remittance of $5.00 per copy per article is paid directly to the Copyright Clearance Center Inc., 27 Congress Street, Salem, MA 01970.

Permission for other use

The copyright owner's consent does not extend to copying for general distribution, for promotion, for creating new works, or for resale. Specific written permission must be obtained from the publisher for such copying.

The Item-Fee Code for this publication is: 0899−5362/92 $5.00 + 0.00

♾ ™ The paper used in this publication meets the minimum requirements of American National Standard for Information Sciences—Permanence of Paper for Printed Library Materials, ANSI Z39.48-1984.

VOLUME CONTENTS

Volume 15 Number 1 **1992**

K. E. Ibrahim, M. T. Hussein and I. M. Giddo	1	Application of combined geophysical and hydrogeological techniques to groundwater exploration: a case study of Showak-Wad Elhelew area, Eastern Sudan
J.-F. Sauvage et M. Sauvage	11	Tectonique, néotectonique et phénomènes ignés à l'extrémité est du fossé de Nara (Mali) : Daounas et lac Faguibine
C. Yaich	35	Dynamique des faciès détritiques oligo-miocènes de Tunisie
L. Asebriy, J. Bourgois, P. de Luca et J. Butterlin	49	Importance d'une tectonique de distension pliocène dans le Rif central (Maroc) : la nappe de Kétama existe-t-elle?
T. K. S. Abam	59	Geomorphic processes and the threat of increased flooding in the Niger Delta
Barth. N. Ekwueme	65	Rb-Sr age of Pan-African migmatites in the Oban Massif of southeastern Nigeria
J. P. Nzenti	73	Prograde and retrograde garnet zoning at high pressure and temperature in metapelitic and grenatite rocks from Yaounde (Cameroon Pan-African north-equatorial fold belt)
Y. H. Poudjom Djomani, M. Diament and Y. Albouy	81	Mechanical behaviour of the lithosphere beneath the Adamawa Uplift (Cameroon, West Africa) based on gravity data
C. Censier, D. Boukeke, P. Perichon et Y. Albouy	91	Mise en évidence de corps d'origine cosmique probable au sein de la formation de Carnot (République Centrafricaine)
F. Walraven, C. Frick and R.T. Lubala	103	Pb-isotope geochronology of the Schiel Complex, Northern Transvaal, South Africa
U. M. Schreiber and P. G. Eriksson	111	An Early Proterozoic braid-delta system in the Pretoria Group, Transvaal Sequence, South Africa
D. R. Hunter, R. G. Smith and D. W. W. Sleigh	127	Geochemical studies of Archaean granitoid rocks in the Southeastern Kaapvaal Province: implications for crustal development
	I	Software Survey Section

Volume 15 Number 2 **1992**

D. R. Hunter and H. C. Halls	153	A geochemical study of a Precambrian mafic dyke swarm, Eastern Transvaal, South Africa
M. C. Jackson	169	A review of the Late Archaean volcano-sedimentary Dominion Group and implications for the tectonic setting of the Witwatersrand Supergroup, South Africa
R. J. Thomas, L. D. Ashwal and M. A. G. Andreoli	187	The petrology of the Turtle Bay Suite: a mafic-felsic granulite association from southern Natal, South Africa
J. N. Dunlevey	207	Pan-African crustal evolution of south-western Africa
I. W. Hälbich, D. Lamprecht, W. Altermann and U. E. Horstmann	217	A carbonate-banded iron formation transition in the Early Protorezoicum of South Africa
K. M. Storetvedt, J. G. Mitchell, M. C. Abranches, S. Maaloe and G. Robin	237	The coast-parallel dolerite dykes of east Madagascar; age of intrusion, remagnetization and tectonic aspects
S. Gichile	251	Granulites in the Precambrian basement of southern Ethiopia: geochemistry, P-T conditions of metamorphism and tectonic setting
A. Becker	265	A time-space model for the genesis of Early Tertiary laterites from the Jos Plateau, Nigeria
C. O. Ofoegbu, M. I. Odigi, C. S. Okereke and N. M. Ahmed	271	Magnetic anomalies and the structure of Nigeria's Oban massif
Orabi H. Orabi	281	Cenomanian-Turonian boundary in Wadi Watir, Southeastern Sinai, Gulf of Aqaba, Egypt
M. A. Alwash and F. A. R. Zakir	293	Tectonic analysis of the Jeddah Taif area on the basis of LANDSAT satellite data
	I	Software Survey Section

Volume 15 Number 3/4 **1992**

J. Sarrot Reynauld, J. Biemi, J. P. Jourda et N. Soro	303	Origine des eaux souterraines du socle cristallin en Côte d'Ivoire
C. M. Doucouré and H. W. Bergh	311	Continental origin of the Mozambique Plateau: a gravity data analysis
Y. Bassias	321	Petrological and geochemical investigation of rocks from the Davie Fracture Zone (Mozambique Channel) and some tectonic implications
G. Bronner and J. P. Fourno	341	Audio-magnetotelluric investigation of allochthonous iron formations in the Archaean Reguibat shield (Mauritania): structural and mining implications
J. Mortimer	353	The Kan River gneiss terrane of central Côte D'Ivoire: mylonitic remnants of an ancient magmatic arc?

M. I. Ogunbajo	369	Distribution of lead and copper in the Ganawuri Granite Complex of Jos Plateau
G. Asomaning	375	Groundwater resources of the Birim basin in Ghana
A. F. Kamel and H. M. Abdel Hadi	385	Photogeological and geophysical studies on the Basement rocks in Wadi El Miyah, Eastern Desert of Egypt
I. P. Farai and A. O. Sanni	399	Year-long variability of Rn-222 in a groundwater system in Nigeria
A. Balduzzi, E. Msaky, E. Trincianti and S. B. Manum	405	Mesozoic Karoo and post-Karoo Formations in the Kilwa area, southeastern Tanzania—a stratigraphic study based on palynology, micropalaeontology and well log data from the Kizimbani Well
R. C. A. Minnitt and C. R. Anhaeusser	429	Gravitational and diapiric structural history of the eastern portion of the Archaean Murchison greenstone belt, South Africa
I. N. Oloto	441	Succession of palynomorphs from the Early Eocene of Gbekebo-1 well in S. W. Nigeria
R. J. Thomas, C. G. A. Marshall, M. K. Watkeys, F. J. Fitch and J. A. Miller	453	K–Ar and $^{40}Ar/^{39}Ar$ dating of the Natal Group, Southeast Africa: a post Pan-African molasse?
P. Saint-Marc	473	Biogeographic and bathymetric distribution of benthic foraminifera in Paleocene El Haria formation of Tunisia
W. Ghebreab, E. Yohannes and L. W. Giorgis	489	The Lega Dembi gold mine: an example of shear zone-hosted mineralization in the Adola greenstone belt, Southern Ethiopia
J. R. Ikingura, P. H. Reynolds, D. H. Watkinson and K. Bell	501	$^{40}Ar/^{39}Ar$ dating of micas from granites of NE Kibaran Belt (Karagwe–Ankolean), NW Tanzania
	I	Software Survey Section
	VII	Volume 15 (1992) Title Page, Volume Contents and Author Index